



6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 2, 15, 90, and 95

[ET Docket No. 19-138; FCC 19-129; FRS 16447]

Use of the 5.850-5.925 GHz Band

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Commission's proposal to amend its rules for the 5.850-5.925 GHz (5.9 GHz) band. The proposal would permit unlicensed devices to operate in the lower 45-megahertz portion of the band at 5.850-5.895 GHz under part 15 of the Commission's rules. It would also permit Intelligent Transportation System (ITS) operations in the upper 30-megahertz portion of the band at 5.895-5.925 GHz under parts 90 and 95 of the Commission's rules. ITS operations would consist of Cellular Vehicle to Everything (C-V2X) devices at 5.905-5.925 GHz, and C-V2X and/or Dedicated Short Range Communications (DSRC) devices at 5.895-5.905 GHz. The document also asks whether alternate spectrum band approaches would better achieve the goal of maximizing the effective and efficient use of the 5.9 GHz band, including whether differently sized sub-bands or greater flexibility to introduce additional vehicular safety communications technologies into the band would be warranted.

DATES: Comments are due on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and reply comments are due on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: You may submit comments, identified by ET Docket No. 19-138, by any of the following methods:

- *Federal Communications Commission's Web Site:* <https://www.fcc.gov/ecfs/>. Follow the instructions for submitting comments.
- *Mail:* Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although the Commission continues to

experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- *People with Disabilities:* Contact the Commission to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by e-mail: FCC504@fcc.gov or phone: 202-418-0530 or TTY: 202-418-0432.

For detailed instructions for submitting comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Howard Griboff, Office of Engineering and Technology, at (202) 418-0657, Howard.Griboff@fcc.gov. For information regarding the Paperwork Reduction Act (PRA) information requirements contained in this document, contact Cathy Williams, Office of Managing Director, at (202) 418-2918 or Cathy.Williams@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Notice of Proposed Rulemaking (*NPRM*), ET Docket No. 19-138, FCC 19-129, adopted on December 12, 2019 and released on December 17, 2019. The full text of this document is available for public inspection and copying during normal business hours in the FCC Reference Center (Room CY-A257), 445 12th Street, SW, Washington, DC 20554, or by downloading the text from the Commission's web site at http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0714/FCC-17-94A1.pdf. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to fcc504@fcc.gov or calling the Commission's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY).

Comment Filing Procedures

Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- **Electronic Filers:** Comments may be filed electronically using the internet by accessing the

ECFS: <http://apps.fcc.gov/ecfs/>.

- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St. SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of *before* entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street SW, Washington DC 20554.

People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

***Ex Parte* Rules – Permit-But-Disclose**

Pursuant to § 1.1200(a) of the Commission's rules, the proceeding this *NPRM* initiates shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are

reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum.

Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with § 1.1206(b). In proceedings governed by § 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Paperwork Reduction Act of 1995

The *NPRM* contains proposed new or modified information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104–13 (PRA). OMB, the general public, and other federal agencies are invited to comment on the proposed information collection requirements contained in the proceeding. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4), the Commission seeks specific comment on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

Synopsis

I. INTRODUCTION AND BACKGROUND

1. The Commission has initiated this *NPRM* to assess the 5.9 GHz band rules and propose appropriate changes to ensure that this 75 Megahertz of mid-band spectrum supports its most effective and efficient use. This “fresh look” approach proposes to repurpose the lower 45-megahertz part of the

band for unlicensed operations, and to continue to dedicate the upper 30 megahertz of the band for transportation and vehicle safety-related purposes.

2. For the past two decades, the non-Federal Mobile Service allocation in the 5.9 GHz band has been reserved for use by DSRC in the ITS service, with specific rules and protocols designed to enable transportation and vehicle safety-related communications. The Commission specified a single technological standard for DSRC based on its expectation that doing so was most likely to promote interoperability between vehicles and infrastructure in the United States, enable robust automotive safety communications, and accelerate the nationwide deployment of DSRC-based applications while reducing costs. Today, DSRC is being used in certain specialized traffic-related projects but has not been widely deployed within the consumer automobile market. Meanwhile, numerous technologies have been or are being developed and deployed in spectrum outside of the 5.9 GHz band to improve transportation safety and efficiency and provide certain services envisioned for DSRC.

3. C-V2X is a new technology that is designed to provide transportation and vehicle safety-related communications. Its proponents want to use C-V2X to provide ITS services in the 5.9 GHz band. In November 2018, the 5G Automotive Association (5GAA), as part of its request for a waiver of the DSRC rules to allow deployment of C-V2X at 5.905-5.925 GHz, asserted that C-V2X represents a significant advancement in technology to increase road safety and maximize the benefits of connected vehicles.

4. In the time since the 5.9 GHz band was set aside for DSRC, unlicensed device use in adjacent and nearby spectrum has developed exponentially. Most of the spectrum between 5.150 GHz to the lower edge of the 5.9 GHz band at 5.850 GHz is available for unlicensed operations under the rules for Unlicensed National Information Infrastructure (U-NII) devices. In 2013, recognizing the increasing demand for wireless broadband services, the Commission began a proceeding to examine the potential for allowing U-NII devices to share the 5.9 GHz band with DSRC. Coexistence evaluation under a three-phase test plan was ongoing at the time the *NPRM* was released. The Commission has noted that different parties have held different opinions regarding how the 5.9 GHz band should be used. These

have included continuing to allow for exclusive use of the band for DSRC, promoting the use of C-V2X in the band, and making the band available for unlicensed operations.

II. DISCUSSION

A. Dedicating Spectrum for Unlicensed Operations and Vehicular Applications

5. Rather than further attempting to resolve questions about co-existence and sharing of spectrum by unlicensed operations and DSRC, the Commission proposes to repurpose the lower 45 megahertz of the 5.9 GHz band (5.850-5.895 GHz) to allow unlicensed operations, and retain use of the upper 30 megahertz of the band (5.895-5.925 GHz) for ITS purposes, either solely for C-V2X or divided between C-V2X and DSRC technologies. This 45/30 megahertz split for unlicensed operations and ITS applications is intended to optimize the use of spectrum resources in the 5.9 GHz band by providing spectrum to support wideband unlicensed operations and continuing to dedicate sufficient spectrum to meet current and future needs for ITS applications. The Commission seeks comment on these proposals and the potential benefits of providing separate sub-bands in which unlicensed operations and vehicular-related systems would operate.

B. 5.850-5.895 GHz – 45 Megahertz for Unlicensed Operations

6. The U-NII bands span much of the 5 GHz band and play a crucial role in accommodating the needs of businesses and consumers for fixed and mobile broadband communications, and specifically, Wi-Fi. These bands provide high data rate local area network connections for business and home users to interconnect with and access the Internet, and are often used for data offloading by commercial wireless networks to relieve congestion when consumer demand is high. The Commission believes that unlicensed use of the 5.850-5.895 GHz portion of the 5.9 GHz band is well suited for such use and could help satisfy the burgeoning demand for high-speed wireless access.

7. The Commission proposes to designate the 5.850-5.895 GHz sub-band for unlicensed operations. The Commission believes that the 5.850-5.895 GHz sub-band (denoted as the U-NII-4 band) could be combined with the adjacent 5.725-5.850 GHz sub-band (denoted as the U-NII-3 band) to provide a large contiguous block of unlicensed spectrum that could be used to deliver more capacity and advanced features to Wi-Fi users. The Commission requests comment on its proposal to designate the 45

megahertz of spectrum at 5.850-5.895 MHz for unlicensed operations.

8. The Commission suggests that because the 5.850-5.895 GHz sub-band is adjacent to the U-NII-3 band, equipment manufacturers should be able to readily and cost-effectively manufacture devices to expand operations into this sub-band. The Commission seeks comment on how easily existing U-NII equipment could be modified to take advantage of the additional 45 megahertz of spectrum proposed for unlicensed operations.

C. 5.895-5.925 GHz – 30 Megahertz for ITS

9. With this *NPRM*, the Commission revisits how best to make use of the 5.9 GHz band as part of a larger ecosystem that includes a variety of spectrum resources—including spectrum outside of the 5.9 GHz band—that can improve and enhance delivery of transportation and vehicular safety-related communications. The Commission seeks comment on the state of DSRC-based deployment and the extent to which existing licensees currently operate on some or all of the existing channels in the 5.9 GHz band. The Commission also seeks comment on the transportation and vehicular safety-related applications that are particularly well-suited for the 5.9 GHz band as compared to spectrum outside of the 5.9 GHz band, and how spectrum outside the 5.9 GHz band can be used efficiently and effectively to provide transportation and vehicular safety-related applications.

10. To ensure the most efficient and effective use of the 5.9 GHz band, the Commission proposes to continue dedicating 30 megahertz of spectrum in the upper portion of the 5.9 GHz band at 5.895-5.925 GHz to support ITS operations in the band. The Commission proposes that designating 30 megahertz of spectrum will be sufficient to support ITS-related functions in the 5.9 GHz band—public safety applications involving safety of life and property—which will be part of a larger wireless ecosystem that advances national transportation and vehicular safety-related goals. The Commission seeks comment on these proposals. Additionally, it seeks comment on whether there are actions it should take, or requirements that it should adopt, to promote rapid and effective deployment of ITS (e.g., establishing appropriate benchmarks for infrastructure deployment or in-vehicle installation).

11. *C-V2X in the 5.905-5.925 GHz band.* The Commission proposes to authorize C-V2X operations in the upper 20 megahertz of the 5.9 GHz band (5.905-5.925 GHz) as a means of authorizing

the ITS technology that is most capable of ensuring the rapid development and deployment of continually improving transportation and vehicular safety-related applications now and into the future, that is robust, secure, and spectrally efficient, and that is able to integrate spectrum resources from other bands as part of its transportation and vehicular safety-related system. The Commission seeks specific and detailed comment on this proposal and views.

12. The Commission seeks comment on whether authorizing C-V2X in this spectrum would be the best means for promoting effective use of this spectrum for ITS, both in terms of maximizing the potential benefits of using 5.9 GHz spectrum for vehicular-related systems (including safety features) and promoting rapid deployment of ITS in the band. The Commission also seeks comment on available technical studies on C-V2X that could inform its consideration of C-V2X, including any recent studies that provide information about how C-V2X would operate in the 5.9 GHz band. The Commission requests that commenters provide detailed information on precisely how C-V2X communications would employ use of 5.9 GHz band frequencies, and how it would integrate and make use of the commercial mobile network infrastructure as part of C-V2X.

13. The Commission also seeks comment on how C-V2X would promote synergies with evolving technologies that use other spectrum resources and that will advance vehicular safety and other intelligent transportation capabilities of today and those anticipated in the coming years. The Commission requests comments from motor vehicle manufacturers, the associated automotive industry, and communications companies regarding authorization of C-V2X operations in this spectrum, including the extent to which their views on ITS development deployment issues have evolved. If C-V2X is best suited to achieve U.S. goals for ITS, how can the Commission best promote C-V2X use consistent with the goals and objectives of ITS, including safety and other vehicular ITS applications, connectivity, rapid development, and deployment?

14. *C-V2X or DSRC in the 5.895-5.905 GHz band.* The Commission seeks comment on whether the remaining 10 megahertz (5.895-5.905 GHz) of the 5.9 GHz band should also be designated for C-V2X. The Commission seeks comment on how to best optimize the spectrum so that this portion of

the 5.9 GHz band can effectively enable the rapid and ongoing development and deployment of transportation and vehicular safety-related functionalities and applications today and in the future.

15. The Commission seeks comment on whether making additional spectrum available for C-V2X beyond 20 megahertz is necessary and appropriate for enabling the development and deployment of advanced C-V2X applications in the band. What additional C-V2X features potentially would be enabled? Commenters that support this approach should explain how C-V2X would make use of the entire 30 megahertz for ITS services and applications, and the potential benefits of this approach.

16. Alternatively, the Commission seeks comment on whether it should continue to set aside the 10 megahertz of spectrum at 5.895- 5.905 GHz for DSRC. The Commission requests comment on the kinds of DSRC-based services that would be possible using 10 megahertz of spectrum. What effect would the Commission's proposals have on any applications delivered using Channel 172 and Channel 184, the two DSRC channels that the Commission previously designated for safety of life applications? Can any such services be provided in the 10-megahertz at 5.895-5.905 GHz? What would be necessary to ensure that DSRC operations adjacent to C-V2X would be compatible? Are there any ITS services that DSRC would provide that cannot effectively be provided using C-V2X? Is dividing the 30 megahertz of ITS spectrum between C-V2X (20 megahertz) and DSRC (10 megahertz) useful and spectrally efficient when it comes to making use of the upper 30-megahertz portion of the band at 5.895-5.925 GHz for ITS services? The Commission asks that commenters supporting DSRC in the 10 megahertz of spectrum at 5.895-5.905 GHz discuss the benefits and costs of their preferred approach. The Commission also seeks comment on whether there is a more appropriate division of the upper 30-megahertz portion of the band at 5.895-5.925 GHz between C-V2X and DSRC.

17. 5GAA indicates that in addition to the 20-megahertz channel requested in its waiver request, it also desires a 40-megahertz channel (i.e., 60-megahertz total) so that the technology it has planned for the band can evolve to include 5G systems and subsequent wireless generations that will amplify and expand upon the safety and other driving applications. Given that the Commission is already on the path to make substantial mid-band spectrum available for 5G in the 2.5 GHz and 3.5 GHz bands,

and is proposing to do so in the 3.7 GHz band, allocating a larger spectrum designation in the 5.9 GHz as a path to 5G appears unnecessary. The Commission nonetheless seeks comment on 5GAA's assertions that 60 megahertz is needed for C-V2X so that the technology planned for the band can evolve to include 5G systems. Is it necessary to plan for such systems in the 5.9 GHz band? If so, can 20 or 30 megahertz of spectrum support 5G automotive applications? What advanced safety applications would be offered on a future 5G system? The Commission seeks comment on whether other 5G spectrum the Commission has made and is making available could be used to support additional C-V2X applications rather than the 5.9 GHz band. Commenters should address how 5G systems might fit into the overall connected vehicle ecosystem.

D. Transition of Existing DSRC Operations

18. Incumbent DSRC operations in the 5.9 GHz band fall into two categories: DSRC roadside units, which are licensed on a non-exclusive, shared basis pursuant to the Commission's part 90 rules, and on-board units, which are licensed-by-rule under part 95. Since the proposals in the *NPRM* may require DSRC incumbents to transition their operations from currently-designated frequencies, the Commission seeks comment on possible transition paths. To assess the potential effects of such a transition, the Commission seeks up-to-date information on actual DSRC operations under existing licenses, as well as the various uses of ITS that have been implemented through DSRC technology in this band. Do the locations of roadside units registered in the Commission's licensing database provide a complete and accurate representation of the deployments under these licenses? To what extent are DSRC operations concentrated in certain parts of the 5.9 GHz band, and how does use of the band vary between on-board and roadside units? Commenters are invited to submit information about the scope of deployment of such on-board units including, if available, the number of units deployed in consumer vehicles versus the number deployed in state, local, Tribal, or other governmental vehicles.

19. To what extent are existing DSRC deployments anticipated to be used on a long-term (versus demonstration) basis, and what is the lifespan of existing DSRC pilot projects? To the extent the Commission adopts the proposals detailed in this *NPRM*, would operators of existing DSRC deployments be likely to pursue C-V2X-based solutions, re-channelize to the remaining DSRC channel (if it adopts

such a plan), or simply wind-down operations? To the extent the Commission grants new or renews existing DSRC authorizations, should it only prescribe such authorizations for a relatively short period of time?

20. The Commission proposes to modify existing DSRC licenses to allow operation in only the 5.895-5.925 GHz sub-band to the extent that licensees want to operate a C-V2X system or only in 5.895-5.905 GHz to the extent this sub-band is retained for DSRC systems and the licensees want to continue their DSRC operations. The Commission seeks comment on these proposals and appropriate transition paths. How would the proposed modifications affect current licensees with operational sites? How might statutory limitations or Commission policy inform the actions that the Commission should take as part of any transition plan? The Commission notes that section 316 of the Communications Act of 1934, as amended, gives the Commission authority to modify entire classes of licenses by a rulemaking or adjudication, though this authority has been interpreted not to extend to any “fundamental change” to the terms of a license. What obligations does section 316 of the Communications Act (or any other provision of the Act) impose on the Commission with respect to incumbent DSRC operations if the Commission were to reallocate the band under any of the proposals on which it seeks comment in this *NPRM*?

21. Are there any transition considerations for on-board units that are different than considerations for roadside units? Considering the potential inability of DSRC on-board units to communicate with non-DSRC on-board units and infrastructure, should the Commission take any actions to remove them from service or require other suitable modifications consistent with any ultimately-adopted revisions to the 5.9 GHz band? Would such units remaining in vehicles impact unlicensed operations assuming the proposals in this *NPRM* are adopted? If on-board units remain in vehicles and DSRC licensees remain permitted to operate only in the 5.895-5.905 GHz sub-band, what effect, if any, would unlicensed operations have on these DSRC units?

22. Should the Commission allow existing DSRC roadside infrastructure to continue to operate under the licenses they hold until the end of their license term without renewal expectation? The Commission seeks comment on whether such an approach would adversely affect the introduction of

unlicensed operations and C-V2X applications. In addition, the Commission requests comment on an appropriate transition timeline for all DSRC operations under any of the approaches it discusses above. Finally, to the extent that the Commission adopts revisions requiring a transition of DSRC operations, the Commission requests comment on any other considerations or approaches that it should take to effectuate an appropriate transition.

E. Technical Rules

23. *Unlicensed Operations in the 5.850-5.895 GHz Sub-band.* Unlicensed devices operate under the conditions of not causing harmful interference and accepting any interference from an authorized radio station. The Commission proposes that U-NII-4 device rules be placed in Part 15, subpart E along with the existing U-NII rules and be subject to all of the general Part 15 operational principles, and seeks comment on this proposal. Because the proposed U-NII-4 band at 5.850-5.895 GHz is located immediately adjacent to the existing U-NII-3 band at 5.725-5.850 GHz, and the Commission expects that manufacturers will design devices that span the U-NII-3 and U-NII-4 bands to implement the widest channel available under the standards—160 megahertz—the Commission proposes that U-NII-4 devices be subject to similar technical and operational rules that apply to the U-NII-3 band.

24. As an initial matter, the Commission proposes that U-NII-4 devices be permitted to operate at the same power levels as U-NII-3 devices, as specified in section 15.407(a)(3) of the Commission's rules. The Commission seeks comment on this proposal or whether it should adopt different power levels. The Commission proposes that U-NII-4 devices, or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands, meet an out-of-band emissions (OOBE) limit of -27 dBm/MHz at or above 5.925 GHz, which is the same limit required for U-NII-3 devices at this frequency. The Commission notes that, for U-NII-3 devices, the -27 dBm/MHz limit increases incrementally to a level of 27 dBm/MHz at the band edge, as shown in section 15.407(b)(4) of the Commission's rules. Because the U-NII-4 band is above the U-NII-3 band and closer to adjacent services (e.g., ITS services in the adjacent portion of the 5.9 GHz band (5.895-5.925 GHz) and 6 GHz fixed services), should the Commission also establish a separate limit at the upper U-NII-4 band edge (i.e., at 5.895 GHz)? If so, what should this limit be? U-NII-3 devices are only required to meet an OOBE limit

of -4.8 dBm/MHz at 5.895 GHz. Should the slope of the OOB from U-NII-4 devices at the upper edge of the band be adjusted to match the OOB limits from U-NII-3 devices or should a different limit be established? If the OOB limits from the U-NII-4 band are adjusted to match the U-NII-3 band OOB limits, can unlicensed devices and ITS devices operate directly adjacent to each other as the emissions into the ITS band would be identical from either U-NII-3 or U-NII-4 devices? The Commission seeks comment generally on the OOB limits it should apply at the upper end of the U-NII-4 band and whether any spectrum must be reserved to protect ITS services, and if so, whether such spectrum should be in the U-NII or ITS segment of the 5.9 GHz band.

25. The Commission further proposes that U-NII-4 devices, or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands, meet the same OOB limits as U-NII-3 devices at the lower edge of the combined U-NII-3 and U-NII-4 band, i.e., at 5.725 GHz. Because the Commission expects devices designed for the U-NII-3 and U-NII-4 bands to be similar and therefore compatible with each other, it does not believe it is necessary to set a separate OOB limit for U-NII-4 devices at the U-NII-3/U-NII-4 band edge. The Commission seeks comment on these proposals as well as comment on whether there are alternative OOB limits that it should adopt.

26. The Commission's proposals support separate U-NII-3 and U-NII-4 bands to provide flexibility in designing U-NII-3 equipment under the less stringent OOB rules at the upper edge of the band. The Commission's proposals also provide flexibility for devices to operate across the U-NII-3 and U-NII-4 bands using the widest bandwidths permitted under the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard. Alternatively, the Commission could expand the U-NII-3 band and implement a single set of OOB limits for the combined 5.725-5.895 GHz band using the OOB limits proposed for U-NII-4 band devices or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands. What advantages would a single band under uniform rules provide? What would be the drawbacks, especially considering the effect on OOB limits? The Commission seeks comment on this alternative. Under the Commission's proposal or this alternative, it also seeks comment on any other rule changes that are needed to support communications across the combined U-NII-3 and U-NII-4 bands.

The Commission seeks comment on how its proposals might affect device design and cost.

27. *Vehicular-Related Communications in the 5.895-5.925 GHz Sub-band.* The Commission proposes to adopt rules for vehicular-related communications in this sub-band that are similar to the Commission's approach when the rules for DSRC operations were adopted. C-V2X, which is based on the 3GPP LTE family of standards (i.e., the 4G LTE-Pro system in 3GPP Release 14, with additional standard work currently underway to develop a 5G C-V2X peer-to-peer mode), is incompatible with DSRC-based operations, which is based on the IEEE 802.11 family of standards. As such, the Commission proposes that the technical rules for C-V2X be based on the 3GPP LTE standard and seeks comment on this proposal and any alternatives that should be considered. In addition, the Commission seeks comment on whether the C-V2X technical rules would be required for all devices operating in the 5.905-5.925 GHz band, or alternatively in the 5.895-5.925 GHz band, should the Commission permit C-V2X operations in the entire 30 megahertz.

28. The Commission's current DSRC rules incorporate by reference the American Society for Testing and Materials (ASTM) E2213-03/ASTM E2233-03 standard. However, that standard has been superseded by a different standard, the IEEE 802.11p. If DSRC operations remain in the band, the Commission seeks comment on whether it should incorporate by reference IEEE 802.11 standards for DSRC operations. Similarly, the Commission seeks comment on whether 3GPP standard(s) for C-V2X operations should be incorporated by reference in the Commission's rules. What are the trade-offs in terms of deployment speed, safety and cost between mandating a particular standard for devices and leaving the choice of equipment to each manufacturer or automotive company? Commenters that advocate for mandating a particular standard should address how the Commission or industry could ensure that devices could be upgraded as the standard is upgraded to incorporate new capabilities and applications.

29. The Commission proposes that its technical rules for C-V2X be based on the 3GPP standard and discusses the specific technical rules that have been identified by 5GAA. These technical specifications are shown in the proposed rules. The Commission further proposes that, if it permits C-

V2X operations across the entire 5.895-5.925 GHz band, it would extend these proposed rules to encompass that entire 30 megahertz. The Commission seeks comment on the specific language of these proposed rules, including the efficacy and technical feasibility of the proposed technical rules.

30. The Commission proposes both conducted and radiated OOB limits for C-V2X equipment and seeks comment on these proposals. In that regard, the Commission seeks comment on the relative in-band versus out-of-band efficiency of antennas in this frequency range and whether both conducted and radiated emissions limits are necessary. The Commission also seeks comment on whether devices should be required to comply with both the conducted and radiated emissions limits or only one of the limits. Further, the Commission seeks comment on the proper reference for the OOB limits, whether it should be the channel edge or the band edge.

31. The Commission proposes that the transmit power limit for C-V2X operation be defined over its channel bandwidth. The Commission seeks comment on this proposal and asks whether a different channel bandwidth for compliance purposes would be more appropriate. The Commission also seeks comment on any alternative technical rules to the existing DSRC regulatory framework. Commenters should address how any technical rules they support ensures the ability of C-V2X operations to deliver services while also ensuring compatibility among different nearby spectrum users (i.e., how the potential for causing interference to other services is minimized). Commenters should specifically address any differences between these proposals, especially with respect to the OOB limits, and the existing DSRC rules.

32. Although the Commission proposes specific rules consistent with those suggested by 5GAA, the Commission also seeks comment on alternatives that are based on the existing DSRC rules or some other regulatory framework. Should the Commission provide additional power to C-V2X stations commensurate with the Equivalent Isotropically Radiated Power (EIRP) levels permitted under the DSRC rules? Should additional power be permitted only for certain applications, such as vehicle-to-network or roadside unit to network communications? Should more power be permitted for all licensees or limited to only government entities as is the case under the current DSRC rules? Or would uniform power levels for

all users better serve the public and avoid the potential for harmful interference? Should antenna height be a factor in how much power is permitted? Commenters advocating for technical limits similar to the existing DSRC rules should address how their alternative rules prevent harmful interference to nearby services.

33. To the extent the Commission retains provisions for DSRC operations in the 5.895-5.905 GHz band, it proposes to retain the existing part 90 and part 95 technical and coordination rules that currently apply to DSRC roadside unit and on-board unit operations on that channel (currently designated as DSRC Channel 180). This includes a power limit of 23 dBm EIRP and adherence to the current OOB limits. The Commission seeks comment on this proposal. Should different power and OOB limits be permitted? For example, should the Commission permit 33 dBm EIRP levels, similar to the power level proposed for C-V2X? If so, what additional measures might need to be imposed on DSRC operations to ensure there is no increased interference to DoD radars? Also, to the extent the Commission retains provisions for DSRC, it would be adjacent to the C-V2X band. Are there any additional technical rules the Commission should adopt for DSRC and/or C-V2X to facilitate their respective operations under this adjacent-channel arrangement?

34. *Incumbent protection.* In addition to the non-Federal Mobile Service allocation currently designated for DSRC, the 5.9 GHz band contains allocations for the Federal Radiolocation Service and the non-Federal Fixed Satellite Service (FSS) (Earth-to-space) on a primary basis, and the Amateur Service on a secondary basis for non-Federal use. The 5.850-5.875 GHz segment of the 5.9 GHz band is designated internationally for Industrial, Scientific, and Medical (ISM) applications.

35. The Department of Defense (DoD) uses the Federal Radiolocation Service to operate fixed and mobile radars for surveillance (including airborne surveillance), test range instrumentation, airborne transponders, and testing in support of the tracking and control of airborne vehicles. The existing DSRC rules for protection of the primary 5.9 GHz band Federal Radiolocation Service require that roadside installations within 75 kilometers around 59 Federal radar locations be coordinated with the National Telecommunications and Information Administration (NTIA). The Commission believes that

requiring C-V2X equipment to likewise coordinate installations within 75-kilometer coordination zones represents the most straightforward approach for enabling compatibility with federal operations. The Commission seeks comment on this proposal, and specifically on whether C-V2X operations at the proposed power levels would in any way alter the previous assumptions for sharing with DoD radars. In addition, the Commission seeks comment on what measures the Commission might establish for C-V2X equipment to ensure the radars are not subject to harmful interference. Commenters should address the potential impact from both roadside and onboard units and provide information as to how such interference could be mitigated by requiring technical or operational constraints on the C-V2X operations in the event harmful interference were to occur.

36. The Commission also seeks comment on whether there are alternate methods to ensure that harmful interference is not caused to federal radars from C-V2X devices if it were to adopt the proposals included in the *NPRM*. Have there been any tests or studies undertaken by C-V2X proponents demonstrating that the C-V2X protocol provides comparable or greater protection to federal radars as compared to DSRC devices? Alternatively, could dynamic or location awareness methods be used by C-V2X systems to automatically reduce power when nearing any of the sites designated for coordination, and could such provisions be made applicable to all C-V2X equipment? The Commission's consideration of on-board units in this regard could become relevant if it adopts final rules that specify different maximum power limits for C-V2X on-board units than those for DSRC on-board units. Under such a regime, how would systems be updated if new DoD radar sites are added? Proponents of any of these options should provide details specifying how the Commission could modify the interference protection rules.

37. As to unlicensed devices in the 5.9 GHz band, the Commission notes that unlicensed devices currently share spectrum with DOD radar operations in the adjacent U-NII-3 band (5.725-5.850 GHz) without implementing any frequency use avoidance techniques, and in general, sharing has been successful. The Commission proposes to adopt the same technical rules (e.g., radiated power, power spectral density, etc.) for U-NII-4 unlicensed devices as apply to U-NII-3 unlicensed devices. The

Commission will continue working with NTIA and DoD to examine and mitigate the potential for harmful interference to DoD radars under these proposed rules and may impose additional technical or operational constraints on U-NII-4 devices. The Commission further seeks comment on whether there are any mitigation measures, such as technical or operational conditions or constraints that it should consider for U-NII-4 operations to protect DoD radars in the 5.9 GHz band.

38. The primary non-federal FSS (Earth-to-space) operations at 5.9 GHz band are part of the “extended C-band” and provide uplinks (Earth-to-space) that are limited to international inter-continental systems and subject to case-by-case electromagnetic compatibility analysis. The majority of these stations are near the coastlines, though there are some inland stations. To enable the required international inter-continental transmissions, these stations transmit to satellites located at longitudes that are not located over the U.S. The Commission previously determined that no coordination requirement is needed to protect FSS uplink operations from harmful interference due to DSRC transmissions. Because C-V2X operations are anticipated to be similar to DSRC operations in their potential for interference, the Commission proposes that coordination with FSS stations is unnecessary to ensure protection from harmful interference due to C-V2X transmissions and seeks comment on this assessment. The Commission further proposes that to the extent DSRC operations remain in the 5.9 GHz band, such stations continue to operate under the current rules; i.e., no coordination is necessary with FSS stations. The Commission seeks comment on this proposal and asks commenters to provide information on the types of FSS uses this band supports and how much this band actually is used (i.e., is it used continuously or only as a back-up if other links go down?). Should the Commission codify coordination procedures, or should they remain under the purview of the interested parties where they can be more easily changed and updated as technology or band usage changes? Although the Commission observes that C-V2X and FSS uplink operations can co-exist without harmful interference, out of an abundance of caution, it also seeks comment on whether any testing or studies have been conducted by proponents of C-V2X that have considered FSS uplink incumbents, and how those results might inform the final rules it adopts.

39. The Commission also proposes not to adopt any restrictions on U-NII-4 devices to

account for the existing non-federal users of the band. The Commission believes that the expected unlicensed device use cases, which primarily involve delivery of Wi-Fi signals along with the distance to FSS satellites in geostationary orbit, should protect FSS uplink operations from harmful interference. The Commission nevertheless seeks comment on whether any targeted rules are needed to ensure the protection of incumbent FSS uplink operations. If so, what types of sharing technology or techniques would be appropriate and what are the cost implications for manufacturers, vendors, and consumers? The Commission also believes that its proposal to apply the existing U-NII-3 power rules to the 5.850-5.895 GHz band will protect co-channel secondary Amateur Service operations from harmful interference. The Commission seeks comment on this proposed approach.

40. With regard to the secondary Amateur Service operations in the 5.9 GHz band, the Commission reasons that no additional rules are necessary to accommodate co-channel C-V2X use with the Amateur Service. The Commission also concludes that its proposal to apply the existing U-NII-3 power rules to the 5.850-5.895 GHz band will protect co-channel Amateur Service operations from harmful interference. Similarly, the Commission proposes that no additional rules are necessary to protect C-V2X devices from ISM operations permitted under Part 18 of the rules in the 5.850-5.875 GHz portion of the band. The Commission seeks comment on these approaches.

41. *Changes to the U.S. Table of Frequency Allocations.* In conjunction with the Commission's proposed use of the 5.895-5.925 GHz sub-band for vehicular-related systems, the Commission proposes conforming modifications to the U.S. Table. Currently under Footnote NG160 in the U.S. Table, use of the non-Federal Mobile Service in the 5.850-5.925 GHz band is limited to DSRC operating in the ITS radio service. The Commission proposes to modify Footnote NG160 to remove the reference to DSRC, refer to ITS generically, and limit ITS use of the Mobile Service to only the 5.895-5.925 GHz band. The Commission seeks comment on this proposal.

F. Vehicular Applications Outside of the 5.9 GHz Band

42. Vehicle-resident technologies are widely deployed in millions of vehicles today without using 5.9 GHz spectrum, and other, more advanced vehicle safety features are under development. The Commission seeks comment on the extent to which the needs for transportation and vehicular safety-

related communications and other ITS applications originally identified for the 5.9 GHz band are already being met through spectrum use outside of the 5.9 GHz band. Is the requirement in the Intelligent Transportation Systems Act of 1998 to consider designating spectrum for ITS still relevant today? Because the Commission's general policy has been to move away from specific spectrum designations in favor of more flexible use, is there still a need to designate spectrum for ITS? Commenters that advocate for a specific designation should provide details regarding the benefits of such a designation including those to the public as well as on equipment designers and manufacturers.

43. Commenters also should consider whether there are other spectrum bands that might be better suited for supporting ITS applications. If so, which ones? What would be the benefit of doing so, e.g., would this lead to more rapid take-up of valuable automotive safety applications? Commenters should address the extent to which some of the 5.9 GHz band might remain critical to the realization of ITS applications. Commenters that support maintaining some 5.9 GHz band spectrum for ITS applications should specify the specific transportation and vehicular safety-related functions to be accommodated in the band and how much bandwidth in this particular band is necessary to achieve those respective functional capabilities. Are all of these applications equally critical to ensure automotive safety and improve the vehicular transportation environment? The Commission seeks comment on how the Commission can ensure that ITS is used for safety of life applications. What are the trade-offs associated with other options, such as the use of different spectrum to provide ITS services? Do the potential safety benefits vary by band or service and, if so, in what way?

44. Could the Commission modify its rules to make it easier to provide for automotive safety applications in other bands or through other radio services? What are the implications of retaining spectrum for ITS in the 5.9 GHz band relative to autonomous vehicles, especially given that autonomous vehicles are already being tested and deployed using applications and technologies other than DSRC for vehicle-to-vehicle communications or other transportation or vehicular-safety related operations?

G. Benefits and Costs

45. The Commission's goal in this proceeding is to revise the current 5.9 GHz band plan to optimize the efficient and effective use of the band by making the band available both for unlicensed use

and ITS services. The Commission seeks to evaluate the benefits and costs of its proposed approach as well as alternatives, and requests comment on how to best calculate these benefits and costs. To date, the band has been underused for ITS services. Designating the 5.850-5.895 GHz band for unlicensed operations is likely to generate quantifiable benefits for consumers, stakeholders, and the American economy. Similarly, the Commission believes removing uncertainty pertaining to the future of ITS services in the band, including the type(s) of technologies that are authorized, would promote more rapid and effective deployment of these services in the band. At the same time, the Commission recognizes that reducing the spectrum available for ITS, depending on the approach taken, potentially could lead to social costs if deployments of ITS would ever occur at wide-scale. The Commission seeks comment on how to best calculate these benefits and costs.

46. The Commission believes that its proposals have the potential to create economic value by resolving uncertainty concerning the future designation of the 5.9 GHz band for both unlicensed uses and ITS services. Specifically, does the economic value of removing this uncertainty and providing a clear direction for use of the band under the proposed new band plan exceed the benefits that might be achieved by continuing on the path set out by the Commission in 2013, when it sought to explore sharing of the band between unlicensed and DSRC devices (and the extensive further testing that this would entail)? Insofar as the Commission's proposal provides certainty that part of the 5.9 GHz band would continue to be reserved for ITS services, and would have the effect of promoting development and deployment of ITS services that make use of this band, how should the Commission evaluate the benefits of such a determination today and into the future?

47. The Commission seeks comment on the benefits and costs of designating a significant portion of this band for unlicensed operations. The Commission notes that other studies have sought to quantify the benefits of unlicensed spectrum, but most have focused on existing allocations rather than on the 5.9 GHz band specifically. The Commission requests comment on the extent to which available studies may provide an appropriate approach for quantifying the benefits associated with proposing to designate 45 megahertz at 5.850-5.895 GHz for unlicensed operations. The Commission also seeks

comment on other potential benefits, including benefits to other licensed or unlicensed users (including ITS users) that may be able to use unlicensed devices in providing services.

48. The Commission also proposes to measure the benefits and costs of reserving 30 megahertz of spectrum in the 5.9 GHz band for ITS and seeks specific comment on how best to evaluate these benefits and costs. In proposing to reserve 30 megahertz of spectrum in the 5.9 GHz band for ITS, the Commission recognizes that many of the technologies that will make use of 5.9 GHz band spectrum are evolving and will continue to evolve in the future. The Commission seeks comment on how to evaluate the benefits and costs of its proposal given the evolving nature of transportation and vehicular safety-related technologies, both within and outside of the 5.9 GHz band. The Commission seeks comment on the extent to which its proposals would make ITS based technologies either more or less effective. To what extent are or will the types of ITS services that would be available through use of the 5.9 GHz band going to be offered using spectrum outside of the 5.9 GHz band? How should the Commission evaluate the benefits and costs of ITS services in the 5.9 GHz band (whether for vehicular safety or other transportation-related applications) using 30 megahertz of spectrum in the band as compared with other amounts of spectrum in the band? The Commission also asks that commenters quantify how the vehicular safety and transportation-related benefits and costs may be affected based on the authorization of C-V2X technologies in the entire 5.895-5.925 GHz sub-band, or alternatively authorizing C-V2X in the upper 20 megahertz and DSRC in the other 10 megahertz. Are there technologies presently being or likely to be developed outside of the 5.9 GHz band that would substantially substitute for benefits of ITS in the 5.9 GHz band?

49. The Commission is cognizant that retaining 30 megahertz of spectrum for ITS in the 5.9 GHz band may have other economic benefits or costs that could be affected by its proposal. For instance, in addition to improving traffic safety, the ITS service was envisioned as having the potential to decrease traffic congestion, facilitate the reduction of air pollution, and help conserve vital fossil fuels. To what extent would these potential benefits be affected by the Commission's proposal? The Commission asks commenters to enumerate and quantify any such alternative effects. Additionally, to the extent that there

are benefits and costs associated with the Commission's proposal for unlicensed operations and ITS services in the 5.9 GHz band, when and over what time horizon would they be realized?

H. Alternate Approaches

50. Are there spectrum band approaches other than those discussed above that may better maximize the effective and efficient use of the 5.9 GHz band? Would creating differently sized sub-bands be a better approach than the Commission's proposed band plan? Are there any additional emerging vehicle safety technologies the Commission should consider for the 5.9 GHz band? Should the Commission provide automakers and the transportation industry with broad flexibility to introduce additional vehicular safety communications technologies into the band, and permit any and all technologies so long as they can co-exist? This could include DSRC, C-V2X, or future spectrum use protocols that might be developed. If so, how should the Commission define successful co-existence and interoperability, and are there ways to ensure that a technology-neutral approach to any future such developments would provide ready access to the band and enable critical safety services without causing harmful interference to incumbent technologies?

51. Commenters should provide detailed justification to support specific band plan options, including the types of services that could or could not be delivered by unlicensed use or by vehicular-related services under each option. Likewise, in each case, commenters should seek to quantify the costs and benefits as well as the risks and opportunities, of the discussed alternatives relative to the Commission's proposed band plan.

III. INITIAL REGULATORY FLEXIBILITY ANALYSIS

52. As required by the Regulatory Flexibility Act of 1980 (RFA), the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) concerning the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the *NPRM*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines in the *NPRM* for comments. The Commission will send a copy of the *NPRM*, including the IRFA, to the Chief Counsel of Advocacy of the Small Business Administration (SBA).

A. Need for, and Objectives of, the Proposed Rules

53. In this NPRM, the Commission assesses the present 5.9 GHz band (5.850-5.925 GHz band) rules and proposes appropriate changes to ensure the spectrum supports its highest and best use. Recognizing the current state of vehicular technology and deployment, and the evolution of the telecommunications market, the Commission proposes to continue to dedicate spectrum – the upper 30 megahertz portion of the band – for transportation and vehicle safety purposes and repurpose the lower 45 megahertz part of the band for unlicensed operations to support high-throughput broadband applications.

54. For the past two decades, the 5.9 GHz band has been spectrum designated for the operation of the Intelligent Transportation System (ITS). The Commission adopted licensing and services rules for Dedicated Short Range Communications (DSRC), and specified a single technological standard based on its expectation that, despite its general preference for leaving the selection of technologies to licensees, a single standard in this band was most likely to promote interoperability between vehicles and infrastructure in the United States, enable robust automotive safety communications, and accelerate the nationwide deployment of DSRC-based applications while reducing costs.

55. Since that time, the DSRC service has evolved slowly and has not been widely deployed within the consumer automobile market (it has found use in certain specialized, traffic-related projects). Meanwhile, numerous technologies have been or are being developed and deployed to improve transportation safety and efficiency and provide the types of services envisioned for DSRC in spectrum outside the 5.9 GHz band. A new technology, Cellular Vehicle to Everything (C V2X), has been gaining momentum as a means of providing transportation and vehicle safety-related communications, and its proponents now seek to operate its technology as an ITS service in the 5.9 GHz band. At the same time, unlicensed device use has developed exponentially elsewhere in the 5 GHz band to become a vital component of the communications landscape. As a result, most of the spectrum between 5.150 GHz to the lower edge of the 5.9 GHz band at 5.850 GHz is available for unlicensed operations. As such, the 5.850-5.895 GHz sub-band in the 5.9 GHz band is especially well positioned to deliver immediate and potentially significant benefits when used by unlicensed devices to meet the intense demand.

56. This *NPRM* proposes to create sub-bands within the 5.9 GHz band to allow unlicensed

operations to operate in the lower 45 megahertz of the band (5.850-5.895 GHz) and reserve the upper 30 megahertz of the band (5.895-5.925 GHz) for ITS, either solely C-V2X or divided between C-V2X and DSRC technologies. This 45/30 megahertz split for unlicensed devices and ITS applications is intended to optimize the use of spectrum resources in the 5.9 GHz band by enabling valuable additions and enhancements to the unlicensed ecosystem and by continuing to dedicate sufficient spectrum to meet current and future ITS needs within the vehicular-related ecosystem. This proposal seeks to provide the spectrum necessary for unlicensed operations to implement the widest, highest throughput channel permitted by the standards, while clarifying the technical rules and eliminating uncertainty for the development and deployment of ITS applications.

B. Legal Basis

57. The proposed action is taken authority found in sections 1, 4(i), 301, 302, 303, 316, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 154(i), 301, 302, 303, 316, and 332, and § 1.411 of the Commission's rules, 47 CFR 1.411.

C. Description and Estimate of Number of Small Entities to Which the Proposed Rules Will Apply

58. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).

59. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* The Commission's actions, over time, may affect small entities that are not easily categorized at present. The Commission therefore describes here, at the outset, three broad groups of small entities that could be directly affected herein. First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the SBA's Office of Advocacy, in

general a small business is an independent business having fewer than 500 employees. These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.

60. Next, the type of small entity described as a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.” Nationwide, as of August 2016, there were approximately 356,494 small organizations based on registration and tax data filed by nonprofits with the Internal Revenue Service (IRS).

61. Finally, the small entity described as a “small governmental jurisdiction” is defined generally as “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.” U.S. Census Bureau data from the 2012 Census of Governments indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number there were 37,132 General purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts and special districts) with populations of less than 50,000. The 2012 U.S. Census Bureau data for most types of governments in the local government category show that the majority of these governments have populations of less than 50,000. Based on this data the Commission estimates that at least 49,316 local government jurisdictions fall in the category of “small governmental jurisdictions.”

62. *Radio Frequency Equipment Manufacturers (RF Manufacturers)*. Neither the Commission nor the SBA has developed a small business size standard applicable to Radio Frequency Equipment Manufacturers (RF Manufacturers). There are several analogous SBA small entity categories applicable to RF Manufacturers - Fixed Microwave Services, Other Communications Equipment Manufacturing, and Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. A description of these small entity categories and the small business size standards under the SBA rules are detailed below.

63. *Fixed Microwave Services*. Microwave services include common carrier, private-

operational fixed, and broadcast auxiliary radio services. They also include the Upper Microwave Flexible Use Service, Millimeter Wave Service, Local Multipoint Distribution Service (LMDS), the Digital Electronic Message Service (DEMS), and the 24 GHz Service, where licensees can choose between common carrier and non-common carrier status. There are approximately 66,680 common carrier fixed licensees, 69,360 private and public safety operational-fixed licensees, 20,150 broadcast auxiliary radio licensees, 411 LMDS licenses, 33 24 GHz DEMS licenses, 777 39 GHz licenses, and five 24 GHz licenses, and 467 Millimeter Wave licenses in the microwave services. The Commission has not yet defined a small business with respect to microwave services. The closest applicable SBA category is Wireless Telecommunications Carriers (except Satellite) and the appropriate size standard for this category under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more. Thus under this SBA category and the associated size standard, the Commission estimates that a majority of fixed microwave service licensees can be considered small.

64. *Other Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing communications equipment (except telephone apparatus, and radio and television broadcast, and wireless communications equipment). Examples of such manufacturing include fire detection and alarm systems manufacturing, Intercom systems and equipment manufacturing, and signals (e.g., highway, pedestrian, railway, traffic) manufacturing. The SBA has established a size standard for this industry as all such firms having 750 or fewer employees. U.S. Census Bureau data for 2012 shows that 383 establishments operated in that year. Of that number, 379 operated with fewer than 500 employees and 4 had 500 to 999 employees. Based on this data, the Commission concludes that the majority of Other Communications Equipment Manufacturers are small.

65. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these

establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment. The SBA has established a small business size standard for this industry of 1,250 or fewer employees. U.S. Census Bureau data for 2012 show that 841 establishments operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, the Commission concludes that a majority of manufacturers in this industry are small.

66. *Automobile Manufacturing.* This U.S. industry comprises establishments primarily engaged in (1) manufacturing complete automobiles (i.e., body and chassis or unibody) or (2) manufacturing automobile chassis only. The SBA has established a size standard for this industry, which is 1,500 or fewer employees. 2012 U.S. Census Bureau data indicate that 185 establishments operated in this industry that year. Of this number, 162 establishments had employment of fewer than 1,000 employees, and 11 establishments had employment of 1,000 to 2,499 employees. Therefore, the Commission estimates that the majority of manufacturers in this industry are small entities.

67. *Internet Service Providers (Non-Broadband).* Internet access service providers such as Dial-up Internet service providers, VoIP service providers using client-supplied telecommunications connections and Internet service providers using client-supplied telecommunications connections (e.g., dial-up ISPs) fall in the category of All Other Telecommunications. The SBA has developed a small business size standard for All Other Telecommunications which consists of all such firms with gross annual receipts of \$35 million or less. For this category, U.S. Census Bureau data for 2012 show that there were 1,442 firms that operated for the entire year. Of these firms, a total of 1,400 had gross annual receipts of less than \$25 million. Consequently, under this size standard a majority of firms in this industry firms can be considered small.

68. *Internet Service Providers (Broadband).* Broadband Internet service providers include wired (e.g., cable, DSL) and VoIP service providers using their own operated wired telecommunications

infrastructure fall in the category of Wired Telecommunication Carriers. Wired Telecommunications Carriers are comprised of establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. The SBA size standard for this category classifies a business as small if it has 1,500 or fewer employees. U.S. Census Bureau data for 2012 show that there were 3,117 firms that operated that year. Of this total, 3,083 operated with fewer than 1,000 employees. Consequently, under this size standard, the majority of firms in this industry can be considered small.

69. *Cable System Operators (Telecom Act Standard).* The Communications Act of 1934, as amended also contains a size standard for small cable system operators, which is “a cable operator that, directly or through an affiliate, serves in the aggregate fewer than one percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000.” As of 2018, there were approximately 50,504,624 cable video subscribers in the United States. Accordingly, an operator serving fewer than 505,046 subscribers shall be deemed a small operator if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed \$250 million in the aggregate. Based on available data, the Commission finds that all but six incumbent cable operators are small entities under this size standard. The Commission notes that it neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250 million. Therefore, the Commission is unable at this time to estimate with greater precision the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

70. *Wireless Telecommunications Carriers (except Satellite).* This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and

wireless video services. The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1,000 employees or more. Thus, under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

71. The *NPRM* proposes rules that will affect reporting and other compliance requirements. The *NPRM* proposes to adopt rules reducing the amount of spectrum available for vehicular-related communications, i.e., ITS, from 75 megahertz (5.850-5.925 GHz) to 30 megahertz (5.895-5.925 GHz) and establish rules for the C-V2X technology that largely follow the Commission's approach when the rules for DSRC operations were adopted, including those designed to protect incumbent operations. The Commission expects that manufacturers would be required to redesign DSRC equipment to reflect the revised band plan (if DSRC remains a technical option in the band) and design C-2X equipment to per the Commission's new rules. The Commission also proposes that a licensee of either technology must register each of its roadside units in the Universal Licensing System before operating such roadside unit and delete from the registration database any roadside units that have been discontinued.

72. The *NPRM* also proposes to allow unlicensed operations in 45 megahertz from 5.850-5.895 GHz (the U-NII-4 band) under the conditions of not causing harmful interference and accepting any interference from an authorized radio station. The Commission proposes that U-NII-4 devices be subject to similar technical and operational rules that apply to the U-NII-3 band, with regard to, e.g., power levels and out-of-band emissions limits. Because the proposed U-NII-4 band at 5.850-5.895 GHz is located immediately adjacent to the existing U-NII-3 band at 5.725-5.850 GHz, the Commission expects that manufacturers will design devices that span the U-NII-3 and U-NII-4 bands to implement the widest channel available under the standards, which will affect device design and cost.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

73. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

74. The proposals that would require equipment modification or new equipment manufacturing would have an impact on equipment manufacturers, some of which may be small entities. Though the Commission believes that its proposed technical rules for the ITS equipment would provide appropriate rules for this band, it seeks comment on alternatives that are based on the existing rules or some other regulatory scheme, with regard to, e.g., power limits and antenna height. The Commission also seeks comment on whether it should adopt different power levels or alternative out-of-band emissions limits for U-NII-4 equipment as compared to other U-NII equipment.

75. In addition, the Commission also seeks general comment on alternative approaches to the spectrum band plan than those discussed, such as creating differently sized sub-bands for unlicensed and ITS, and technology neutral approaches to use of the ITS band.

76. The regulatory burdens the Commission has proposed are necessary in order to ensure that the public receives the benefits of innovative services and technologies in a prompt and efficient manner and apply equally to large and small entities, thus without differential impact. Comments with proposed alternatives will assist in reaching the best outcomes. The Commission will continue to examine alternatives in the future with the objectives of eliminating unnecessary regulations and minimizing any significant impact on small entities.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

77. None.

IV. ORDERING CLAUSES

78. IT IS ORDERED that pursuant to the authority found in sections 1, 4(i), 301, 302, 303, 316, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 154(i), 301, 302, 303, 316, and 332, and § 1.411 of the Commission's rules, 47 CFR 1.411, that this Notice of Proposed Rulemaking is hereby *adopted*.

79. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, *shall send* a copy of this Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

List of Subjects

47 CFR Part 2

Radio, Telecommunications.

47 CFR Part 15, 90, and 95

Communications equipment, Radio.

Federal Communications Commission.

Marlene Dortch,
Secretary.

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2, 15, 90, and 95 as follows:

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106 is amended by revising footnote “NG160” to read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

NG160 In the band 5895-5925 MHz, the use of the non-Federal mobile service is limited to operations in the Intelligent Transportation System radio service.

* * * * *

PART 15 – RADIO FREQUENCY DEVICES

3. The authority citation for part 15 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

4. Section 15.401 is revised to read as follows:

§ 15.401 Scope.

This subpart sets out the regulations for unlicensed National Information Infrastructure (U-NII) devices operating in the 5.15-5.35 GHz and 5.47-5.895 GHz bands.

5. Section 15.403 is amended by revising paragraph (s) to read as follows:

§ 15.403 Definitions.

* * * * *

(s) *U-NII devices*. Intentional radiators operating in the frequency bands 5.15-5.35 GHz and 5.470-5.895 GHz that use wideband digital modulation techniques and provide a wide array of high data rate mobile and fixed communications for individuals, businesses, and institutions.

6. Amend § 15.407 by:

- a. Redesignating paragraphs (a)(4) and (5) as paragraphs (a)(5) and (6);
- b. Adding new paragraph (a)(4);
- c. Revising newly redesignated paragraph (a)(6);
- d. Revising the introductory text of paragraph (b)(4);
- e. Redesignating paragraphs (b)(5) through (7) as paragraphs (b)(6) through (8);
- f. Adding new paragraph (b)(5); and
- g. Revising paragraph (e).

The additions and revisions to read as follows:

§ 15.407 General technical requirements.

* * * * *

(a) * * *

(4) For the band 5.85-5.895 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

* * * * *

(6) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly,

alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.895 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

* * * * *

(b) * * *

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

* * * * *

(5) For transmitters operating solely in the 5.850-5.895 GHz band or operating on a channel that spans across 5.850 GHz:

(i) All emissions at or above 5.925 GHz shall not exceed an e.i.r.p. of -27 dBm/MHz.

(ii) All emissions below 5.725 GHz shall be limited to a level of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

* * * * *

(e) Within the 5.725-.5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

* * * * *

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

7. The authority citation for part 90 continues to read as follows:

Authority: 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7), 1401-1473.

8. Section 90.7 is amended by adding the definition of “Cellular Vehicle to Everything (C-V2X) Communications Services” in alphabetical order and revising the definitions of “On-Board unit (OBU),” “Roadside unit (RSU)” and “Roadway bed surface” to read as follows:

§ 90.7 Definitions.

* * * * *

Cellular Vehicle to Everything (C-V2X) Service. The use of cellular radio techniques defined by the 3rd Generation Partnership Program (3GPP) to transfer data between roadside and mobile units, between mobile units, and between portable and mobile units to perform operations related to the improvement of traffic flow, traffic safety, and other intelligent transportation service applications in a variety of environments. C-V2X Service systems may also transmit status and instructional messages related to the units involved.

* * * * *

On-Board Unit (OBU). An On-Board Unit is a DSRC or C-V2X Service transceiver that is normally mounted in or on a vehicle, or which in some instances may be a portable unit. An OBU can be operational while a vehicle or person is either mobile or stationary. The OBUs receive and transmit on one or more radio frequency (RF) channels. Except where specifically excluded, OBU operation is permitted wherever vehicle operation or human passage is permitted. The OBUs mounted in vehicles are licensed by rule under part 95 of this chapter and communicate with Roadside Units (RSUs) and other OBUs. Portable OBUs are also licensed by rule under part 95 of this chapter.

Roadside Unit (RSU). A Roadside Unit is a DSRC or C-V2X Service transceiver that is mounted along a road or pedestrian passageway. An RSU may also be mounted on a vehicle or is hand carried, but it may only operate when the vehicle or hand-carried unit is stationary. Furthermore, an RSU operating under this part is restricted to the location where it is licensed to operate. However, portable or hand-held RSUs are permitted to operate where they do not interfere with a site-licensed operation. An RSU broadcasts data to or exchanges data with OBUs.

Roadway bed surface. For DSRC or the C-V2X Service, the road surface at ground level.

* * * * *

9. Section 90.149 is amended by revising paragraph (b) to read as follows:

§ 90.149 License term.

* * * * *

(b) Non-exclusive geographic area licenses for Roadside Units (RSUs) under subpart M of this part in the 5895-5925 MHz band will be issued for a term not to exceed ten years from the date of original issuance or renewal. The registration dates of individual RSUs (see § 90.375) will not change the overall renewal period of the single license.

10. Section 90.155 is amended by revising paragraph (i) to read as follows:

§ 90.155 Time in which station must be placed in operation.

* * * * *

(i) Roadside Units (RSUs) under subpart M of this part in the 5895-5925 MHz band must be placed in operation within 12 months from the effective date of registration (see § 90.375) or the authority to operate the RSUs cancels automatically (see § 1.955 of this chapter). Such registration date(s) do not change the overall renewal period of the single license. Licensees must notify the Commission in accordance with § 1.946 of this chapter when registered units are placed in operation within their construction period.

11. Section 90.175 is amended by revising paragraph (j)(16) to read as follows:

§ 90.175 Frequency coordinator requirements.

* * * * *

(j) * * *

(16) Applications for DSRCS and C-V2X Service licenses (as well as registrations for Roadside Units) under subpart M of this part in the 5895-5925 GHz band.

* * * * *

12. Section 90.179 is amended by revising paragraph (f) to read as follows:

§ 90.179 Shared use of radio stations.

* * * * *

(f) Above 800 MHz, shared use on a for-profit private carrier basis is permitted only by SMR, Private Carrier Paging, LMS, DSCRS, and C-V2X Service licensees. See subparts M, P, and S of this part.

13. Section 90.205 is amended by revising paragraph (q) to read as follows:

§ 90.205 Power and antenna height limits.

* * * * *

(q) 5895-5925 MHz. Power and height limitations are specified in subpart M of this part.

* * * * *

14. Section 90.210 is amended by revising the entry of “5850-5925” in the table and footnote 4 to read as follows:

§ 90.210 Emission masks.

* * * * *

Applicable Emission Masks Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
* * * * *		
5895-5925 ⁴		
* * * * *		

⁴ DSRCS and C-V2X Service Roadside Units in the 5.895-5.925 GHz band is governed under Subpart M of this part.

* * * * *

15. In § 90.213 amend paragraph (a) by revising footnote 10 to the table to read as follows:

§ 90.213 Frequency stability.

(a) * * *

¹⁰ Frequency stability for DSRCS and C-V2X Service equipment in the 5895-5925 MHz band is specified in subpart M of this part. For all other equipment, frequency stability is to be specified in the station authorization.

* * * * *

16. Section 90.350 is revised to read as follows:

§ 90.350 Scope.

The Intelligent Transportation Systems (ITS) radio service is for the purpose of integrating radio-based technologies into the nation's transportation infrastructure and to develop and implement the nation's intelligent transportation systems. It includes the Location and Monitoring Service (LMS), the Dedicated Short-Range Communications Service (DSRCS), and the Cellular Vehicle to Everything (C-V2X) Service. Rules as to eligibility for licensing, frequencies available, and any special requirements for services in the Intelligent Transportation Systems radio service are set forth in this subpart.

Subpart M – [Amended]

17. Amend Subpart M, consisting of §§ 90.350 through 90.383, by revising the undesignated heading after § 90.365 to read as follows:

* * * * *

REGULATIONS GOVERNING THE LICENSING AND USE OF FREQUENCIES IN THE 5895-5925 MHZ BAND FOR DEDICATED SHORT-RANGE COMMUNICATIONS SERVICE (DSRCS) AND CELLULAR VEHICLE TO EVERYTHING (C-V2X) SERVICE

* * * * *

18. Section 90.370 is added to subpart M to read as follows:

§ 90.370 Permitted frequencies.

(a) DSRCS Roadside Units (RSUs) are permitted to operate in the 5895-5905 MHz band.

(b) C-V2X Service RSUs are permitted to operate in the 5905-5925 MHz band.

(c) Channels are available on a shared basis only for use in accordance with the Commission's rules.

All licensees shall cooperate in the selection and use of channels in order to reduce interference. This includes monitoring for communications in progress and any other measures as may be necessary to minimize interference. Licensees of RSUs suffering or causing harmful interference within a communications zone as defined in § 90.375 of this part are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height and direction, additional filtering, or area or hours of operation of the stations concerned. Further the use of any channel at a given

geographical location may be denied when, in the judgment of the Commission, its use at that location is not in the public interest; use of any such channel may be restricted as to specified geographical areas, maximum power, or such other operating conditions, contained in this part or in the station authorization.

(d) Frequencies in the 5895-5925 MHz band will not be assigned for the exclusive use of any licensee.

19. Section 90.371 is amended by revising the section heading, removing paragraph (a), redesignating paragraphs (b) and (c) as paragraphs (a) and (b) and revising the introductory text of newly redesignated paragraph (a) to read as follows:

§ 90.371 DSRCS and C-V2X Service.

(a) DSRCS and C-V2X Service Roadside Units (RSUs) operating in the band 5895-5925 MHz shall not receive protection from Government Radiolocation services in operation prior to the establishment of the RSU. Operation of RSU stations within 75 kilometers of the locations listed in the table below must be coordinated through the National Telecommunications and Information Administration.

* * * * *

20. Section 90.373 is amended by revising the introductory text to read as follows:

§ 90.373 Eligibility in the DSRCS and C-V2X Service.

The following entities are eligible to hold an authorization to operate Roadside units in the DSRCS or C-V2X Service:

* * * * *

21. Section 90.375 is revised to read as follows:

§ 90.375 License areas, communication zones, and registrations

(a) Roadside Units (RSUs) in the 5895-5925 MHz band are licensed on the basis of non-exclusive geographic areas. Governmental applicants will be issued a geographic area license based on the geopolitical area encompassing the legal jurisdiction of the entity. All other applicants will be issued a geographic area license for their proposed area of operation based on county(s), state(s) or nationwide.

(b) Applicants who are approved in accordance with FCC Form 601 will be granted non-exclusive

licenses for the channel(s) corresponding to their intended operations (see § 90.370). Such licenses serve as a prerequisite of registering individual RSUs located within the licensed geographic area described in paragraph (a) of this section. Licensees must register each RSU in the Universal Licensing System (ULS) before operating such RSU. RSU registrations are subject, inter alia, to the requirements of § 1.923 of this chapter as applicable (antenna structure registration, environmental concerns, international coordination, and quiet zones). Additionally, RSUs at locations subject to NTIA coordination (see § 90.371(a)) may not begin operation until NTIA approval is received. Registrations are not effective until the Commission posts them on the ULS. It is the licensee's responsibility to delete from the registration database any RSUs that have been discontinued.

(c) Licensees must operate each RSU in accordance with the Commission's rules and the registration data posted on the ULS for such RSU. Licensees must register each RSU for the smallest communication zone needed for the intelligent transportation systems application using one of the following four communication zones:

RSU class	Maximum output power (dBm) ¹	Communications zone (meters)
A	0	15
B	10	100
C	20	400
D	28.8	1000

¹ As described in the IEEE 802.11p-2010 Standard and ATIS transposed standards of the 3GPP (incorporated by reference, *see* § 90.379).

22. Section 90.377 is revised to read as follows:

§ 90.377 Maximum EIRP and antenna height.

(a) DSRCs and C-V2X Service licensees shall transmit only the power (EIRP) needed to communicate with an On-Board Unit (OBU) within the communications zone and must take steps to limit the Roadside Unit (RSU) signal within the zone to the maximum extent practicable.

(b) DSRCS and C-V2X Service licensees must limit RSU output power to 20 dBm and equivalent isotopically radiated power (EIRP) to 33 dBm. The EIRP is measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam.

(c) The radiation center of an RSU antenna shall not exceed 8 meters above the roadway bed surface, except that an RSU may employ an antenna with a height exceeding 8 meters but not exceeding 15 meters provided the EIRP specified in paragraphs (a) and (b) of this section is reduced by a factor of $20 \log(Ht/8)$ in dB where Ht is the height of the radiation center of the antenna in meters above the roadway bed surface. The RSU antenna height shall not exceed 15 meters above the roadway bed surface.

23. Section 90.379 is revised to read as follows:

§ 90.379 Technical standards for Roadside Units

(a) DSRCS Roadside Units (RSUs) operating in the 5895-5905 MHz band must comply with the technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p-2010.

(b) C-V2X Service RSUs operating in the 5905-5925 MHz band shall comply with the V2X sidelink service for this band as described in the ATIS transposed standards of the 3GPP specifications except where these rules and regulations take precedence.

(c) The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Federal Communications Commission, 445 12th Street SW., Washington, D.C. 20554 and is available from the sources indicated below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to www.archives.gov/federal-register/cfr/ibrlocations.html.

(1) 802.11p-2010, IEEE Standard for Information technology– Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments (2010). This standard

is available from the Institute of Electrical and Electronics Engineers (IEEE), 3025 Boardwalk Drive, Suite 220, Ann Arbor, MI 48108, 1-855-999-9870, <http://www.techstreet.com/ieee>.

(2) 3GPP Release 14, 3rd Generation Partnership Project Technical Specification Group Services and System Aspects (2018). This standard is available from ATIS, 1200 G Street NW Suite 500, Washington, D.C. 20005, <https://www.atis.org/docstore/default.aspx>.

24. Section 90.381 is added to read as follows:

§ 90.381 C-V2X Service emissions limits.

C-V2X Service Roadside Units (RSUs) must comply with the following out-of-band emissions limits:

(a) Conducted limits measured at the antenna input shall not exceed:

- (1) -29 dBm/100 kHz at the band edge (The band is defined in § 90.370 of this part);
- (2) -35 dBm/100 kHz \pm 1 megahertz from the band edge;
- (3) -43 dBm/100 kHz \pm 10 megahertz from the band edge; and
- (4) -53 dBm/100 kHz \pm 20 megahertz from the band edge.

(b) Radiated limits: All C-V2X Service RSUs must limit radiated emissions to -25 dBm/100 kHz EIRP or less outside the band edges where the band is defined in § 90.370 of this part.

25. Section 90.383 is amended by revising the introductory text and paragraph (b) to read as follows:

§ 90.383 RSU sites near the U.S./Canada or U.S./Mexico border.

Until such time as agreements between the United States and Canada or the United States and Mexico, as applicable, become effective governing border area use of the 5850-5925 MHz band, authorizations to operate Roadside Units (RSUs) are granted subject to the following conditions:

* * * * *

(b) Authority to operate RSUs is subject to modifications and future agreements between the United States and Canada or the United States and Mexico, as applicable.

26. Section 90.415 is amended by revising paragraph (b) to read as follows:

* * * * *

(b) Render a communications common carrier service, except for stations in the Public Safety Pool providing communications standby facilities under § 90.20(a)(2)(xi) and stations licensed under this part in the SMR, private carrier paging, Industrial/Business Pool, 220-222 MHz or the DSRCS and C-V2X Service.

27. Section 90.421 is revised by adding paragraph (d) to read as follows:

§ 90.421 Operation of mobile station units not under the control of the licensee.

* * * * *

(d) DSRCS and C-V2X Service On-Board Units licensed by rule under part 95 of this chapter may communicate with any roadside unit authorized under this part or any licensed commercial mobile radio service station as defined in part 20 of this chapter.

28. Section 90.425 is amended by revising paragraph (d)(10) to read as follows:

§ 90.425 Station identification.

* * * * *

(d) * * *

(10) It is a Roadside Unit (RSU) in an ITS system.

PART 95 -PERSONAL RADIO SERVICES

29. The authority citation for part 95 continues to read as follows:

Authority: 47 U.S.C. 154, 303, and 307.

Subpart L—[Amended].

30. Subpart L, consisting of §§ 95.3101 through 95.3189, is amended by revising the subpart heading to read as follows:

Subpart L—DSRCS and C-V2X Service On-Board Units

31. Section 95.3101 is revised to read as follows:

§ 95.3101 Scope.

This subpart contains rules that apply only to On-Board Units (OBUs) transmitting in the 5895-5925

MHz frequency band in the Dedicated Short-Range Communications Services (DSRCS) and the Cellular Vehicle to Everything (C-V2X) Service (see § 90.371 of this chapter).

32. Section 95.3103 is amended by adding the definition of “Cellular Vehicle to Everything (C-V2X) Service” in alphabetical order and by revising the definition of “On-Board Unit (OBU)” to read as follows:

§ 95.3103 Definitions, OBUs.

Cellular Vehicle to Everything (C-V2X) Service. A service providing for data transfer between various mobile and roadside transmitting units for the purposes of improving traffic flow, highway safety and performing other intelligent transportation functions. See § 90.7 of this chapter for a more detailed definition.

* * * * *

On-Board Units (OBUs). OBUs are low-power devices on vehicles that transfer data to roadside units or other OBUs in the Dedicated Short-Range Communications Service or the Cellular Vehicle to Everything (C-V2X) Service (see §§ 90.370-90.383 of this chapter), to improve traffic flow and safety, and for other intelligent transportation system purposes. See § 90.7 of this chapter.

* * * * *

33. Section 95.3131 is revised to read as follows:

§ 95.3131 Permissible uses, OBUs.

On-Board Units (OBUs) may transmit signals to other OBUs and to Roadside Units (RSUs), which are authorized under part 90 of this chapter or to licensees as defined in part 20 of this chapter.

§ 95.3159 [Removed].

34. Section 95.3159 is removed.

35. Section 95.3161 is amended by revising paragraph (a) to read as follows:

§ 95.3161 OBU transmitter certification.

(a) Each On-Board Unit (OBU) C-V2XC-V2Xthat operates or is intended to operate in the DSRCS or C-V2X Service must be certified in accordance with this subpart and subpart J of part 2 of this chapter.

* * * * *

36. Section 95.3163 is revised to read as follows:

§ 95.3163 OBU frequencies.

- (a) DSRCS On-Board Units (OBUs) are permitted to operate in the 5895-5905 MHz band.
- (b) C-V2X Service OBUs are permitted to operate in the 5905-5925 MHz band.

37. Section 95.3167 is revised to read as follows:

§ 95.3167 OBU transmit power limit.

- (a) The maximum output power for portable DSRCS On-Board Unit (OBU) transmitter types is 1.0 mW.
- (b) The maximum output power for vehicular and portable C-V2X Service OBU transmitter types is 20 dBm and the maximum equivalent isotopically radiated power (EIRP) is limited to 23 dBm.
- (c) The power limits in paragraphs (a) and (b) of this section may be referenced to the antenna input, so that cable losses are taken into account.
- (d) For purposes of this section, a portable unit is a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

38. Section 95.3179 is added to read as follows:

§ 95.3179 Unwanted emissions limits.

- (a) C-V2X Service Roadside Units must comply with the following out-of-band emissions limits:
 - (1) Conducted limits measured at the antenna input shall not exceed:
 - (i) -29 dBm/100 kHz at the band edge (The band is defined in section 95.3163 of this part.);
 - (ii) -35 dBm/100 kHz \pm 1 megahertz from the band edge;
 - (iii) -43 dBm/100 kHz \pm 10 megahertz from the band edge; and
 - (iv) -53 dBm/100 kHz \pm 20 megahertz from the band edge.
 - (2) Radiated limits: All C-V2X Service On-Board Units must limit radiated emissions to -25 dBm/100 kHz EIRP or less outside the band edges where the band is defined in section 95.3163 of this part.

(b) DSRCs out-of-band emissions limits are specified in the IEEE 802.11p-2010 standard (See section 95.3189 of this part)

39. Section 95.3189 is revised to read as follows:

§ 95.3189 OBU technical standard.

(a) DSRCs On-Board Unit (OBU) transmitter types operating in the 5895-5905 MHz band must be designed to comply with the technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p-2010.

(b) C-V2X Service OBU transmitter types operating in the 5895-5925 MHz band shall comply with the V2X sidelink service for this band as described in the ATIS transposed standards of the 3GPP specifications except where these rules and regulations take precedence.

(c) The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Federal Communications Commission, 445 12th Street SW., Washington, D.C. 20554 and is available from the sources indicated below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to www.archives.gov/federal-register/cfr/ibrlocations.html.

(1) 802.11p-2010, IEEE Standard for Information technology – Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments (2010). This standard is available from the Institute of Electrical and Electronics Engineers (IEEE), 3025 Boardwalk Drive, Suite 220, Ann Arbor, MI 48108, 1-855-999-9870, <http://www.techstreet.com/ieee>.

(2) 3GPP Release 14, 3rd Generation Partnership Project Technical Specification Group Services and System Aspects (2018). This standard is available from ATIS, 1200 G Street NW Suite 500, Washington, D.C. 20005, <https://www.atis.org/docstore/default.aspx>.

Appendix A to part 95 is amended by removing the entry in the table for “95.1509 - ASTM E2213-03

DSRC Standard.”.

[FR Doc. 2020-02086 Filed: 2/5/2020 8:45 am; Publication Date: 2/6/2020]